5

DSM2 Input and Output

Fixed Input

Fixed input is that data and information which does not vary with model time: such things as run start and stop dates, channel geometry, reservoir and gate information, runtime parameters, output locations, and so on. Fixed input is divided into sections. Sections can be in a single file, and sections may be duplicated, with new information overwriting previous information. This allows one to create a base set of files, overwriting only that information which changes for a particular run.

Each section starts with a section keyword. For most sections, the second line will be the field keywords, which tell the input system what data appears in which fields. Then the data itself follows, and finally an END keyword, which closes the section. Keywords and variable names be upper or lower case. For most sections, one field keyword is required (e.g. channel number), with the rest optional. This means if one is using a base file with a subsequent file to overlay some data changed from the base case, only the changed fields need to be listed.

Blank lines and comments may appear anywhere in any fixed input file; comments start with the pound (#) character and continue to the end of the line. Environment variables are denoted with a dollar sign ($), and may optionally be surrounded with parentheses or curly braces, for example: $STUDY $(STUDY) ${STUDY}. Environment variables are replaced with their value, then processed in the input system for on-the-fly input file customization.

Individual Files

Sections are described below with examples given. Full input files are also referenced. Required sections are marked with an asterisk (*); required field keywords are marked with an asterisk (*).

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* Channel Numbering *

* Reservoirs

I/O

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I/O

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* Particle Insertion
* Hydro Binary Tide Files for Qual and PTM

Fixed Input Description

The following describes the use of various section keywords related to Fixed Input and includes examples of their use.

Channels

Section keyword: CHANNELS

Field keywords: CHAN* LENGTH MANNING DISP DOWNNODE UPNODE XSECT

Required: yes Overwrites: yes; By: CHAN

8
9
10
11
12
13
14
15
169
170
171
16
17
etc.
END

Reservoirs

Section keyword: RESERVOIRS

Field keywords: NAME* AREA STAGE BOTELV NODE COEFF2RES COEFF2CHANMAXQ2RES

Required: no Overwrites: yes; By: NAME

Description: Describes the reservoirs to be used in the run.

NAME - name of reservoir
AREA - surface area, million square feet
STAGE - initial stage in feet, same datum as BOTELV in XSECTS section
BOTELV - bottom elevation in feet, same datum as BOTELV in XSECTS section

(Note: The following three keywords may be repeated for as many nodes the reservoir is connected to.)

NODE - node number the reservoir is connected to
COEFF2RES - flow coefficient from channel to reservoir
COEFF2CHAN - flow coefficient to channel from reservoir
MAXQ2RES - maximum allowed flow to reservoir

Example:

NAME	AREA	STAGE	BOTELV	NODE	COEFF2RES	COEFF2CHAN	NODE	COEFF2RES	COEFF2CHAN
CLFCT	91.86800	5.02	-10.1	72	1200.	0.			
2	42.29960	5.02	-14.1	127	2000.	2000.	129	2000.	2000.
FRANKS	141.17864	5.02	-10.1	219	2000.	2000.	225	2000.	2000.

END

```
  8
  9
 10
 11
 12
 13
 14
 15
169
170
171
 16
 17
# etc.
END

# Clifton Court inflow restriction
RESERVOIRS
NAME   NODE   MAXQ2RES
CLFCT  72     15000.
END
```

Include Input Files

Section keyword: INP_FILES

Field keywords: none

Required: no

Description: Each line in the Include Input Files section is a filename (either full pathname or relative to the run directory) which directs the input system to read in that file and process it as part of the fixed input system. This allows different sections to be in different files for convenience and clarity. Also, for many sections, the same section can be read in multiple times, subsequent values overwriting previous values.

Example:

```
INP_FILES
# files that would tend to change for each run
runtime.inp                     # runtime control
scalar.inp                      # other scalar
data, constants

# files that would not be changed often
../dsm2-input-files/junctions.inp       # junction spec
../dsm2-input-files/reservoirs.inp      # reservoir info
END
```

Input/Output Filenames

Section keyword: IO_FILES

Field keywords: MODEL* TYPE* IO* INTERVAL FILENAME*

Required: no Overwrites: yes; By: MODEL+TYPE+IO

Description: This section specifies the filenames of input/output files, and if filenames are given for restart and binary input or output turns on processing for those files (general echo output is always on).

MODEL - input/output for which model
TYPE - NONE, RESTART (ASCII restart file) or BINARY (binary state file)
IO - whether IN (input, to be read) or OUT (output, to be written)
INTERVAL - NONE, or time interval to write (15 min, 1 hour, etc.)
FILENAME - filename to read or write

Example:

```
IO_FILES
MODEL       TYPE   IO     INTERVAL FILENAME
# general echo output
output      none   none   none     models/io/hydro.out
# restart output, 1 hour interval
hydro       restart out    1hour    models/io/hydro-rst.out
# restart input
hydro       restart in     none     models/io/hydro-rst.inp
# tidefile output, 15 minute interval
hydro       binary out     15min    models/io/hydro-unf.out
END
```

Time-Varying Input

Section keyword: INPUTPATHS

Field keywords: NODE* NAME* MEAS_TYPE* INTERVAL*
A_PART B_PART C_PART* E_PART* F_PART
SDATE STIME ID
PRIORITY FILLIN FILENAME VALUE

Required: yes Overwrites: no

Description: Provides information to locate time-varying data (flows, stages, gate operations, water quality, etc.) in DSS during the run. All time-varying input for Hydro and Qual must come from DSS files. Time-varying input is given by node number, or a name which translates to a node number.

NODE - node number
NAME - location name, must translate to node number. Used for DSS B part.
MEAS_TYPE - type of data: flow, stage, gate, ec, tds, etc. Used for DSS C part.
INTERVAL - time interval: 15MIN, 1HOUR, 1DAY, 1MON, IR-DECADE. Used for DSS E part.
A_PART, B_PART, C_PART, E_PART, F_PART - DSS A, B, C, E, and F parts. Use instead of MEAS_TYPE, INTERVAL, and ID.
SDATE - optional start date, if different from model run start date
STIME - optional start time, if different from model run start time

(Note: If used, the data will start at the given date, regardless of the model start time. Use "GENERIC" to indicate the data starts at the standard generic time (01JAN3001 0000). Use "SYNC" to indicate that the data time should be synchronized to the model time based on the interval or e part. For instance, for a data interval of 1MON, the system will attempt to always use January data for a January model time, etc. Synchronized data must have a generic start date, and must not contain missing data.)

ID - identification, study name, etc. Used for DSS F part.
PRIORITY - optional priority of this path (integer between 0 and N). If a higher priority (lower number) path's data is missing or bad, then the next lower priority path at the same location will be used to replace it. Paths are assumed to be at the same location if they are at the same object (node, channel, or reservoir). This allows for filled-in data to automatically be used from a separate pathname, without having to create a single path for a location. A priority of 0 means ignore the priority system, always use the path.
FILLIN - use LAST data value, or INTERPolate between values, or use either last or interpolation based on whether the DATA is averaged or instantaneous.
FILENAME - DSS filename to find data
VALUE - numeric value to use as constant input value for entire run

Example:

```
INPUTPATHS
# input paths that have alternate start dates, and placename
NAME   MEAS_TYPE INTERVAL  SDATE      ID        FILLIN
FILENAME
SAC    flow    ir-decade 31may1994   test1      INTERP
/input-files/input.dss
SJR    flow    1hour     generic     test1      DATA
/input-files/input.dss
END

INPUTPATHS
# input path at a node, has first priority
NODE  MEAS_TYPE  INTERVAL   ID   FILLIN  PRIORITY FILENAME
  3   EC         1day       Study1  LAST     1    input.dss
END
INPUTPATHS
# input path at a node, with constant value; use if main path's
# data is missing
```

```
NODE  MEAS_TYPE  INTERVAL   ID      FILLIN  PRIORITY   VALUE
  3   EC         1mon       Study1  LAST    2          200.0
END
```

Time-Varying Output

Section keyword: OUTPUTPATHS

Field keywords: CHAN* DIST* NODE* TYPE* INTERVAL* PERIOD* MODIFIER
A_PART B_PART C_PART E_PART F_PART
FILENAME* FROM_NAME FROM_TYPE FROM_NODE

Required: no Overwrites: no

Description: Time-varying text and DSS output is specified in this section.

(Note: Provide either CHAN and DIST, or NODE, or NAME; either TYPE, or C_PART; either INTERVAL, or E_PART.)

CHAN - channel number
DIST - distance downstream along channel; LENGTH means to use channel length
NODE - node number

(Note: cannot use node number for Hydro output (stage, velocity, or flow); only Qual output. Qual output at a node will always be the mixed concentration at the node.)

NAME - location name, translation provided to translate to channel or node number. Used for DSS B part.
TYPE - type of data (stage, flow, etc.) Used for DSS C part.
INTERVAL - time interval (15MIN, 1HOUR, 1DAY, etc.) Used for DSS E part.
PERIOD - INST (instantaneous) or AVE (average over interval)
MODIFIER - study name, etc. If this is the string 'runtime', a model run date-time string will be used; this allows different runs to automatically be labeled differently.If 'none', no string will be used. If this field is not used, and the environment variable DSM2MODIFIER is set, that will be used instead.
A_PART, B_PART, C_PART, E_PART, F_PART - DSS A, B, C, E, and F parts. Use instead of TYPE, INTERVAL, and MODIFIER.
FILENAME - file to write to, if it ends in .DSS, use a DSS file,otherwise the output file will be a text file.

The following three fields are used only by Qual, to track conservative constituent input sources from location names, accounting types, and node numbers.

FROM_NAME - track conservative constituents from a location name.
FROM_TYPE - track conservative constituents from an accounting type.
FROM_NODE - track conservative constituents from a node number.

Example:

```
OUTPUTPATHS
CHAN        DIST        TYPE        INTERVAL    PERIOD  MODIFIER      FILENAME
1           0           stage       15min       inst    mrg_0718-rst  out.dss
82          0           stage       15min       inst    mrg_0718-rst  out.dss
83          LENGTH      stage       15min       inst    mrg_0718-rst  out.txt
END

# for Qual only
OUTPUTPATHS
NAME   FROM_NAME     TYPE   INTERVAL PERIOD FILENAME
union  mtz          ec     1day     ave    qual.txt
union  vernalis     ec     1day     ave    qual.txt
END

OUTPUTPATHS
NAME   FROM_TYPE TYPE  INTERVAL PERIOD FILENAME
union  rim       ec  1day     ave    qual.txt
ec5468 drain     ec  1day     ave    qual.txt
union  drain     ec  1day     ave    qual.txt
END
```

Translations

Section keyword: TRANSLATION

Field keywords: NAME* CHAN* DIST* NODE* RESERVOIR*

Required: no Overwrites: yes; By: NAME

Description: This section translates between place names and node or channel-distance. It allows the use of place names in input and output sections.

(Note: provide either CHAN and DIST, or NODE, or RESERVOIR.)

NAME - place name (location)
CHAN - DSM2 channel number
DIST - distance downstream along channel; LENGTH means to use channel length
NODE - node number
RESERVOIR - reservoir name

Example:

```
TRANSLATION
NAME   CHAN   DIST
cvp    216    0
dxc    365    0
mtz    441    LENGTH
sac    410    0
END

TRANSLATION
# translations to reservoir name
NAME   RESERVOIR
swp    clfct
bbid   clfct
END
```

Types

Section keyword: TYPE

Field keywords: STRING PART MATCH SIGN ACCOUNT VALUE_IN VALUE_OUT

Required: no Overwrites: no

Description: This section assigns accounting types to matching pathnames, for later use in Qual and PTM; changes the sign of specified time-series input values; and can change the incoming value itself. DSM2-Hydro requires that sinks (flows out of nodes and reservoirs) be negative and that sources be positive. Often sinks will be stored in a DSS file as a positive number (e.g. pumping values); the SIGN field will change the sign internally in DSM2 without changing the database. The ACCOUNT field can be used to assign a type to matching pathnames which can later be used by Qual and PTM for accounting purposes in the output. The VALUE_IN and VALUE_OUT fields are used to change incoming values, usually for gate codes or perhaps bogus values in the DSS input file.

STRING - String in pathname or label name to match.
PART - Part of pathname or label to match:
    a=A part; b=name or B part; c=measurement type or C part;
    e=interval or E part; f=modifier or F part; l=name label;
    p=entire pathname.
MATCH - An exact match, or a substring.
SIGN - Make the matching pathnames a negative or positive value
    (it does not invert the value).
ACCOUNT - Assign an accounting code to the match.
VALUE_IN - Incoming value to check.

VALUE_OUT - If string and incoming value match, assign VALUE_OUT to the value used. Codes are allowed (GATE_OPEN, GATE_CLOSE, and GATE_FREE), as well as any numeric value.

Example:

```
TYPE
STRING        PART    MATCH   SIGN
CCC           1       exact   -       # Contra Costa Canal
SWP           B       exact   -       # Banks pumping
DICU-IRR      F       sub     -       # Irrigation pumping
END

TYPE
STRING        PART    MATCH   ACCOUNT
CCC           B       exact   DIV
SWP           B       exact   EXPORT
SAC           B       exact   RIM
DICU-SEEP     F       sub     SEEP
DICU-IRR      F       sub     DIV
DICU-DRN      F       sub     DRAIN
END

TYPE
STRING  PART    MATCH   VALUE_IN VALUE_OUT
dxc     b       exact   1.0      gate_open
END
```

Scalars

Section keyword: SCALAR

Field keywords: none

Required: yes Overwrites: yes; By: scalar name

Description: This section is used to input the values of single variables (scalars) to DSM2. Each line in the scalars section consists of two fields: the variable name, and the value (in that order).

(Note: The flush_output interval should be kept at one day or greater; less than one day will result in long times to write to DSS at the end of a run.)

Example:

```
SCALAR
run_start_date          01jun1994
run_start_time          0000
#run_start_date         restart         # use restart file time to start the run
#run_start_date tidefile                # use tidefile time to start run
#run_end_date   31aug1994               # if used, comment out run_length
#run_end_time   1500
run_length     91DAY_15HOUR            # if used, comment out run end
                                         date/time

flush_output    5day                   # interval to flush output;
                                       # better if >= 1day
display_intvl   1hour                  # how often to display model time progress
checkdata       false                  # check input data w/o simulation

cont_missing    true                   # continue on missing data (uses
                                       # previous value)
cont_unchecked  true                   # continue on unchecked data
cont_question   true                   # continue on questionable data
                                       # (use data value)
cont_bad        true                   # continue on bad data

warn_unchecked  false                  # warn about unchecked data
warn_question   false                  # warn about questionable data
warn_missing    t                      # warn about missing data

printlevel      1                      # amount of printing, 0 to 9,
                                       # increasing with number.
temp_dir        d:\temp                # directory to use for scratch
                                       # files

# following all Hydro variables
hydro_time_step 5min                   # time step length
deltax          5000                   # spatial discretization, feet

repeating_tide  f                      # t = repeating tide run
max_tides       15                     # maximum number of tide cycles
                                       # to repeat
tide_length     25hour                 # tide length
toler_stage     0.0010                 # tolerance for error in sum of
                                       # repeated stages
toler_flow      0.0020                 # tolerance for error in indiv of
                                       # repeated flows
```

```
terms          dyn                  # Terms: dynamic, diffusion,
                                    # or kinematic
vardensity     f                    # f = constant density,
                                    # t = variable density.
varsinuosity   f                    # f = constant sinuosity,
                                    # t = variable sinuosity.

gravity        32.02                # acceleration due to gravity.
theta          0.6                  # time-weighting factor.
maxiter        9                    # maximum number of iterations
                                    # per time step.
luinc          2                    # interval for complete forward
                                    # eliminations.
toleranceq     0.5                  # tolerance for closure on
                                    # discharge.
tolerancez     0.005                # tolerance for closure on
                                    # water-surface elevation.

# following all Qual variables

Qual_time_step  15min               # Qual time step
Dispersion      t                   # true Activate dispersion
Init_Conc       100.0               # initial concentration value
tide_length     25hour              # tide length
END
```

Titles

Section keyword: TITLES

Field keywords: none

Required: no Overwrites: no

Description: Each line in the Title section is used as a title or header for later printouts. Typically the user would enter a description of the run in this section.

Example:

```
TITLES
  Test run with full Sacramento-San Joaquin Delta network.
END
```

Rectangular Cross Sections

Section keyword: XSECTS

Field keywords: XSECT* WIDTH BOTELV INIT-STAGE INIT-FLOW

Required: yes Overwrites: yes; By: XSECT

Description: The cross sections given in the CHANNELS section are listed here. Only rectangular cross sections are specified in this section; irregular cross-sections are given in Irregular Cross-Sections. Initial stages and flows at the cross section are given; these can be overwritten with a restart file.

XSECT - cross section number
WIDTH - width in feet of rectangular section
BOTELV - bottom elevation of rectangular section, usually w.r.t. NGVD
INIT-STAGE - the initial stage in feet; same datum as BOTELV
INIT-FLOW - the initial flow, cubic feet per second

Example:

```
XSECTS
XSECT  WIDTH  BOTELV  INIT-STAGE    INIT-FLOW
  1    192.0  -5.10     5.25          0.01
  2    192.0  -5.10     5.25          0.01
END
```

Irregular Cross Sections

Section keyword: IRREG_GEOM

Field keywords: CHAN* DIST* FILENAME*

Required: yes Overwrites: yes; By: CHAN DIST

Description: The irregular cross sections, if any, are listed here. Only irregular cross sections are specified in this section; rectangular cross-sections are given in Rectangular Cross-Sections.

CHAN - DSM2 channel number.
DIST - distance downstream from upstream end, normalized between zero and one. The actual distance will be calculated internally, multiplying the normalized distance here with the channel length in the CHANNELS section.
FILENAME - the file containing cross-sectional area, wetted perimeter, top width, etc. in table form (example format). This file is produced by the Cross Section Display Program (CSDP).

Example:

```
IRREG_GEOM
CHAN    DIST     FILENAME
  6    0.62093   irregular_xsects/6_0.62093.txt
  7    0.25863   irregular_xsects/7_0.25863.txt
  7    0.86019   irregular_xsects/7_0.86019.txt
END
```

Junctions

Section keyword: JUNCTIONS

Field keywords: NODE* BOUNDARY*

Required: yes Overwrites: Yes; By: NODE

Description: Any junction that has a stage boundary (the stage is specified at the junction) must be listed here. Usually only one junction will have a stage boundary. Flow boundary junctions need not be listed.

Example:

```
JUNCTIONS
NODE   BOUNDARY
361    STAGE
END
```

Gates

Section keyword: GATES

Field keywords: NAME* OPER NODE CHAN LOC NGATES WIDTHUP WIDTHDOWN CRESTELEV NPIPES PIPERAD PIPEELEV CFWEIRUP CFWEIRDOWN CFPIPEUP CFPIPEDOWN WIDTHFREE ELEVFREE

Required: no Overwrites: yes; By: NAME

Description: Describes the gates to be used in the run. Weirs and pipes (culverts) can be used in the same gate. Multiple gates not allowed at the same location. A gate can have multiple gates and pipes. The number of gates open at any time can be controlled during the run from DSS values.

NAME - name of gate.
OPER - type of operation:
- TIME - get open/close timing from DSS, see note below.
- CALC - calculate open/close timing from operational criteria (stage difference, etc).
- OPEN - always opened: use the flow coefficients given, all gates open.

CLOSE - always closed: set the flow coefficients to zero.
IGNORE - ignore gate; same as commenting out line.
FREE - gate installed but free-flow (no obstruction); produces similar but not identical results as IGNORE

NODE - node number, if reservoir gate.
CHAN - DSM2 channel number the gate is in.

LOC - UP or DOWN for upstream or downstream end of channel.
NGATES - number of gate openings for weir-type gate.
WIDTHUP - width of gate, upstream direction.
WIDTHDOWN - width of gate, downstream direction.
CRESTELEV - crest elevation in feet, same datum as channels.
NPIPES - number of pipes (culverts).
PIPERAD - pipe radius, feet.
PIPEELEV - pipe invert elevation in feet, same datum as channels.
CFWEIRUP - flow coefficient for weirs, upstream direction.
CFWEIRDOWN - flow coefficient for weirs, downstream direction.
CFPIPEUP - flow coefficient for pipes, upstream direction.
CFPIPEDOWN - flow coefficient for pipes, downstream direction.
WIDTHFREE - width to use for free-flow (gate installed but not an obstruction)
ELEVFREE - crest elevation to use for free-flow (gate installed but not an obstruction)

(Note: The number of gate (weir-type) openings is specified in NGATES and defaults to one. The number of gates open at any time can be read from DSS if the OPER value for a gate is TIME. Thus, for instance, for the Delta Cross Channel, NGATES should be 2, and possible values from DSS should be 0 (all gates closed; no low), 1 (one gate open, one gate closed), or 2 (both gates open). In addition, a value of 10 means to activate the 'free-flow' regime, which leaves the gate installed but with no flow impediment. Tests show this produces a very similar flow to leaving the gate out entirely. Consequently, gates can be installed and uninstalled during a single model run.)

Example:

```
GATES
# gates on reservoirs--the coeffs are given in the reservoir
# section
NAME   OPER  NODE
clfct  time   72
END

# gates that are weirs
GATES
NAME   OPER   CHAN   LOC  WIDTHDOWN WIDTHUP CRESTELEV CFWEIRDOWN
CFWEIRUP
dxc    open   365    up   120.0    120.0    -13.6     0.90     0.90 #DXC
gl_cn  ignore 213    down 359.0    359.0    -10.0     0.20     0.20
END
```

```
# gates that are pipes
GATES
NAME   OPER  CHAN LOC  NPIPES PIPERAD PIPEELEV CFPIPEDOWN CFPIPEUP
old_r  time   80 up   9    2.00    -0.10     0.00      0.60
END

# both weir and pipe
GATES
NAME   OPER  CHAN LOC WIDTHDOWN WIDTHUP CRESTELEV CFWEIRDOWN
CFWEIRUP NPIPES PIPERAD PIPEELEV CFPIPEDOWN CFPIPEUP
mid_r  ignore 134 up  140.00   140.00   -3.00      0.8
0.8    6    2.00    -4.00   0.00      0.60
# Above is just one long line of input
END

# multiple gate openings at a gate structure
GATES
NAME    NGATES
dxc     2
END

#  Widths and crest elevations for free flow
GATES
NAME    WIDTHFREE      ELEVFREE
gl_cn   500.0          -20.0
orhrb   150.0          -10.0
END
```

Internal Flow Transfer

Section keyword: OBJ2OBJ

Field keywords: FROM_TYPE* FROM_NAME* TO_TYPE* TO_NAME*
INPUT_LABEL FLOW
COEFF_POS COEFF_NEG ACCOUNT NAME

Required: no Overwrites: no

Description: Allows for internal flow transfer between object (nodes and reservoirs).

(Note: Use either INPUT_LABEL, or FLOW.)

FROM_TYPE - from what type of object (currently "reservoir" or "node").
FROM_NAME - "from" object name or number.
TO_TYPE - to what type of object (currently "reservoir" or "node").
TO_NAME - "to" object name or number.

INPUT_LABEL - the label (name) used for an input path. The value of the input path at each time step will be used for the flow transfer value.
FLOW - a constant value to use for the flow value.
COEFF_POS - for stage-driven flow between two reservoirs: the flow coefficient in the positive (FROM -> TO) direction.
COEFF_NEG - for stage-driven flow between two reservoirs: the flow coefficient in the negative (TO -> FROM) direction.

ACCOUNT - accounting label to give this transfer.
NAME - name to give this transfer.

Example:

```
# CALFED Isolated Facility using object-to-object flows
OBJ2OBJ
FROM_TYPE FROM_NAME  TO_TYPE TO_NAME   INPUT_LABEL   NAME
node      IF_in      reservoir clfct    IF_flow      if
END
```

Tides

Section keyword: TIDEFILE

Field keywords: START_DATE* START_TIME END_DATE* END_TIME FILENAME*

Required: yes (for Qual and PTM) Overwrites: no

Description: This section lets Qual and PTM know what order to use the binary output files from Hydro which contain channel flows and stages, reservoir flows, and external flows. Each time-averaged set of flows, along with its timestamp, is called a 'tide block'; a single tidefile will typically contain several of these tideblocks, along with some preliminary header information. If the tidefile was generated by a repeating tide, then the tideblocks will usually be 15 minutes or 1 hour in length, and the collection of tideblocks in a single tidefile will span exactly one tidal day (the length of a tidal day is specified in the SCALAR section, keyword TIDE_LENGTH.

START_DATE - starting date of tidefile. Use a date spec if desired (e.g. 05JAN1987), or use 'generic' to ignore the tidefile time stamp and simply start with the model run. Use 'runtime' or leave empty to try to find the model start runtime in the tidefile. Use 'last' or 'previous' to start right after the previous tidefile ends (not allowed on first tidefile).
START_TIME - starting time of tidefile. If 'generic' or 'last' was given for START_DATE, this can be 'none', or leave out the field, otherwise use a time spec (e.g. 1700).
END_DATE - ending date of tidefile. Use either a date spec, or a time length (e.g. 3day_5hour), or 'length' to mean use the entire length of the tidefile. If the tidefile is repeating (if it was generated by a repeating tide run in Hydro), and 'length' is given, then the tidefile will be recycled an integer number of times.

END_TIME - ending time of tidefile; use a time spec or 'none', or leave out the field.

Example:

```
TIDEFILE
START_DATE END_DATE    FILENAME
generic   6day        ../output-files/hydro-unf-rpt-1h.out
last      length      ../output-files/hydro-unf-rpt-15m.out
END
```

Non-Conservative Constituents RateCoefficients

Section keyword: RATE_COEFFS

Field keywords: CHANNEL* RESERVOIR* TYPE* CONSTITUENT* VALUE*

Required: no Overwrites: yes; By: channel number and reservoir name

Description: Reaction coefficients for non-conservative constituents in channels and reservoirs are specified in this section.

(Note: CHANNEL and/or RESERVOIR are required.)

CHANNEL - channel number(s); may use grouping, for instance: 1-5,7,11-20.
RESERVOIR - reservoir name(s); may use comma-separated list
TYPE - type of coefficient. Allowed values are DECAY, SETTLE,
BENTHIC, ALG_GROW, ALG_RESP.
CONSTITUENT - non-conservative constituent name. Allowed values
are ALGAE, BOD, DO, NH3, NO2, NO3, ORGANIC_N,
ORGANIC_P, PO4, TEMP
VALUE - the rate coefficient value

Example:

```
rate_coeffs
channel       reservoir   type       constituent   value
1-55,60,61    CLFCT,2,3   decay      BOD           1.1
1-55,60,61    CLFCT,2,3   settle     BOD           0.24
1-55,60,61    CLFCT,2,3   benthic    DO            200.
1-55,60,61    CLFCT,2,3   decay      ORGANIC_N     0.1
END
```

Flux Output

Section keyword: PARTICLE_FLUX

Field keywords: FROM_WB* TO_WB* INTERVAL* PERIOD* MODIFIER FILENAME*

Required: no Overwrites: no

Description: PTM Flux text and DSS output is specified in this section.

FROM_WB - a list of waterbody types and IDs. The waterbody types are separated by whitespace (space or tab); the IDs follow each waterbody type separated by commas. This tells the PTM to track particles passing from the specified waterbody types/IDs. IDs are either numbers (for channels and nodes), or names (for reservoirs and flow types), or accounting labels. If no waterbodies are given, then all particles passing to the TO_WB waterbodies are counted. 'All' for an ID means to count all waterbodies of that kind (e.g. all external flows). A waterbody ID preceeded with a minus sign "-" means to remove that from the list.

TO_WB - same as FROM_WB, except this tells the PTM to track particles going to the waterbodies.

(Note: Separate the above two fields of data with the pipe "|" character.)

INTERVAL - time interval (15MIN, 1HOUR, 1DAY, etc.)

B_PART - DSS B part for flux.

MODIFIER - study name, etc. If this is the string 'runtime', a model run date-time string will be used; this allows different runs to automatically be labeled differently. If 'none', no string will be used. If this field is not used, and the environment variable DSM2MODIFIER is set, that will be used instead.

FILENAME - file to write to, if it ends in .DSS, use DSS file, otherwise text file.

Example:

```
PARTICLE_FLUX
FROM_WB      TO_WB         INTERVAL    FILENAME     b_part
chan,436,53 | chan,442,437 |   1day     flux.txt    past_Chipps
chan, 441 | stage, mtz |       1day     flux.txt     past_MTZ
res,clfct | qext,swp |         1day     flux.txt     past_SWP
chan,83,217,82 | res, clfct |   1day     flux.txt     past_72
chan, 216 | qext,cvp |         1day     flux.txt     past_CVP
 | qext,div,-cvp,-nb,-ccc |    1day     flux.txt  Ag_Diversions
 | qext,div |                  1day     flux.txt All_Diversions
END
```

Particle Insertion Input

Section keyword: PARTINP

Field keywords: NODE* NPARTS* SDATE* STIME EDATE* ETIME SLENGTH LENGTH

Required: yes Overwrites: no

Description: Specifies to the PTM when and where to insert particles into the system.

(Note: Provide either SDATE and STIME, or SLENGTH; and either EDATE and ETIME, or LENGTH.)

NODE - node number to insert particles at.
NPARTS - number of particles to insert each time step.
SDATE,STIME - when to start inserting particles; 'runtime' indicates to start at model runtime (same as SLENGTH==0).
EDATE,ETIME - when to stop inserting particles.
SLENGTH - how long after start of run to start inserting particles.
LENGTH - how long an interval to insert particles (e.g. 1DAY or 23HOUR)

Example:

```
PARTINP
NODE   NPARTS  SDATE        STIME  EDATE        ETIME
330    100     29dec1992    0100   29dec1992    0200
330    100     runtime      none   29dec1992    0200
END

PARTINP
NODE   NPARTS  SLENGTH LENGTH
361    100     1hour   5day_3hour
END
```

Time-Varying Input and Output

Time-varying input and output are data such as boundary stage ,external and internal flows, gate positions, and water quality concentrations. For this information, we use the Hydrologic Engineering Center Data Storage System (HECDSS) database written by the U.S. Army Corps of Engineers for hydrologic data.

HECDSS

HECDSS was chosen for the time-varying database system because compared to relational databases it is fast and does not consume excessive storage or computing resources; it is available for a wide variety of computers (PCs, Unix, and mainframes); and may be used interactively and as subroutine calls from Fortran. With HECDSS the timing of events are known precisely during the model run, and can be displayed clearly in the input and the output, reducing ambiguity.

Regular and Irregular Time-Varying Data

HECDSS supports two types of time-varying data: irregular and regular intervals. Irregular time-series data does not occur at regularly spaced intervals. For each event, the DSS file stores the date and time, and the data value. Regular time-series data occurs at timed intervals, for example, every hour or every day. Regularly spaced data can be stored more compactly, because the starting date and time, and the interval, are stored only once. Each event stores only the data value.

Note that regular time-series data can be stored as irregular, but irregular data cannot be stored as regular. Thus, one could store all data as irregular, but this would be inefficient for file size and retrieval time.

DSS Pathnames

DSS stores data by using pathnames. A DSS pathname is composed of the six following parts: 1) general grouping name; 2) location; 3) parameter (flow, stage, etc.); 4) block start date; 5) time interval or block length; 6) descriptor

A typical pathname now used by DSM2:

/DELTA/BANKSPP/FLOW/01JAN1997/1HOUR/OBS-DWR-OM/

IEP equivalent:

/HIST+CHAN/CLFCT000/FLOW-EXPORT/01JAN1997/1HOUR/DWR-OM-DFD/

Converting from ASCII to DSS

Before a model run, the user prepares ASCII files containing the time-varying data values, then runs preprocessors on the ASCII files to convert the data into DSS files. The preprocessors are included in the DSS package available from HEC: they are dssits and dssts, as well as dssts2, developed from dssts by DWR. The ASCII input files are different for each preprocessor.

Use dssits for irregular-time data. Dssts should be used for regular interval data that have no time gaps in the list. Dssts2 should be used for regular interval data that have gaps in the list.

dssits Input File Explanation

/tmp/input.dss	name of DSS file to receive data
/DELTA/DXC/GATE/01JUN1994/IR-DECADE//	DSS pathname for this data stream
POS	data units (here, gate position)
INST-VAL	instantaneous value or period average
31May1994 2400 1	date, time, value for each event
01Jun1994 1200 0	
02Jun1994 0500 1	
END	end of this data stream
/DELTA/CLFCT/GATE/01JUN1994/IR-DECADE//	pathname for new data stream
POS	
INST-VAL	
31May1994 2400 1	
END	
FINISH	end of file

dssts Input File Explanation

/tmp/input.dss	name of DSS file to receive data
/DELTA/MTZ/STAGE/01JUN1994/1HOUR// DSS	pathname for this data stream
FEET	data units (here, feet of stage)
PER-AVER	instantaneous value or period average
01JUN1994 0000	date and time of first value
-0.08	values for events at each interval
-0.52	
M	missing data must be explicitly marked
-0.26	
0.76	
0.54	
END	end of this data stream
/DELTA/SWP/FLOW/01JUN1994/1HOUR//	pathname for new data stream
CFS	
PER-AVER	
01JUN1994 0000	
381	
400	
500	
END	
FINISH	end of file

dssts2 Input File Explanation

/tmp/input.dss	name of DSS file to receive data
/DELTA/MTZ/STAGE/01JUN1994/1HOUR// DSS	pathname for this data stream
FEET	data units (here, feet of stage)
PER-AVER	instantaneous value or period average
01JUN1994 0000 -0.08	date, time, value for events at each interval
01JUN1994 0100 -0.52	
01JUN1994 0200 M	missing data can be explicitly marked
01JUN1994 0300 -0.26	
01JUN1994 0600 0.76	note time gap in input stream
01JUN1994 0700 0.54	
END	end of this data stream
FINISH	end of file

Running the Utilities

All three utilities are run from a command line prompt in this manner:

<utility> IN=<input filename> OUT=<output log filename>, for instance, dssts IN=test.dat OUT=test.log

In unix, instead of IN and OUT, you can use redirection: dssts < test.dat > test.log

Be sure to check the log files for any error messages pertaining to the conversion. The utilities will check for dates and times that are out of sequence, invalid characters in the value fields, etc.

For more information on DSS, consult the following URL:
http://www.wrchec.usace.army.mil/publications/pubs_distrib/hecdss.html

Input Specification Section

Time-varying input to Hydro and Qual is specified in the INPUTPATHS section of the fixed input. This section has the following components:

Section keyword: INPUTPATHS

Field keywords: NODE NAME MEAS_TYPE INTERVAL
A_PART B_PART C_PART E_PART F_PART
SDATE STIME ID
PRIORITY FILLIN FILENAME VALUE

(Note: Provide either NODE, or NAME; either MEAS_TYPE or C_PART; either INTERVAL or E_PART; and either FILENAME or VALUE.)

Section required: yes Overwrite: no

Description: Provides information to locate and access time-varying input data (flows, stages, gate operations, water quality, etc.) from DSS during the run. All time-varying input for Hydro and Qual must come from DSS files. Time-varying input is applied to a node number, or a name which translates to a node number.

Field Keyword Description
NODE - node number.
NAME - location name, must translate to node number. Used for DSS B part.
MEAS_TYPE - type of data: flow, stage, gate, ec, tds, etc. Used for DSS C part.
INTERVAL - time interval: 15MIN, 1HOUR, 1DAY, 1MONTH,
IR-DECADE. Used for DSS E part.
ID - identification, study name, etc. Used for DSS F part.
A_PART, B_PART, C_PART, E_PART, F_PART - DSS A, B, C, E, and F parts. (Use instead of MEAS_TYPE, INTERVAL, and ID.)
SDATE - optional start date, if different from model run start date.
STIME - optional start time, if different from model run start time.

(Note: If used, the data will start at the given date, regardless of the model start time. Use "GENERIC" to indicate the data starts at the standard generic time (01JAN3001 0000). Use "SYNC" to indicate that the data time should be synchronized to the model time based on the interval or E part. For instance, for a data interval of 1MON, the system will attempt to always use January data for a January model time, etc. Synchronized data must have a generic start date, and must not contain missing data.)

PRIORITY - optional priority of this path (integer between 0 and N). This allows for alternate or filled-in data to automatically be used from separate pathnames, without having to create a path for a location. If a higher priority (lower number) path's data is missing or bad, then the next lower priority path at the same location will be used to replace it. Paths are assumed to be at the same location if they are at the same object (node, channel, or reservoir). A priority of 0 means ignore the priority system, always use the path.
FILLIN - use LAST data value, or INTERPolate between values, or use either last or interpolation based on whether the DATA is averaged or instantaneous.
FILENAME - DSS filename to find data.
VALUE - numeric value to use as constant input value for entire run.

Examples:

INPUTPATHS—
input paths that have alternate start dates, and placename.

NAME	MEAS_TYPE	INTERVAL	SDATE	ID	FILLIN	FILENAME
SAC	flow	ir-decade	31may1994	test1	INTERP	/inputfiles/input.dss
SJR	flow	1hour	generic	test1	DATA	/input-files/input.dss

END

INPUTPATHS—
input path at a node, has first priority.

NODE	MEAS_TYPE	INTERVAL	ID	FILLIN	PRIORITY	FILENAME
3	EC	1day	Study1	LAST	1	/input-files/input.dss

END

INPUTPATHS—
input path at a node, with constant value; use if main path's data is missing.

NODE	MEAS_TYPE	INTERVAL	ID	FILLIN	PRIORITY	VALUE
3	EC	1mon	Study1	LAST	2	200.0

END

Output Specification Section

Time-varying output from Hydro and Qual is specified in the OUTPUTPATHS section of the fixed input. This section has the following components:

Section keyword: OUTPUTPATHS

Field keywords: CHAN DIST NODE TYPE INTERVAL PERIOD MODIFIER
A_PART B_PART C_PART E_PART F_PART
FILENAME FROM_NAME FROM_TYPE FROM_NODE

Section required: no Overwrite: no

Description: Time-varying text and DSS output is specified in this section.

(Note: provide either CHAN and DIST, or NODE, or NAME; either TYPE, or C_PART; either INTERVAL, or E_PART.)

Field Keyword Description
CHAN - channel number.
DIST - distance downstream along channel; LENGTH means to use the channel length.
NODE - node number.

(Note: cannot use node number for Hydro output (stage, velocity, or flow); only Qual output. Qual output at a node will always be the mixed concentration at the node.)

NAME - location name, translation provided in TRANSLATION section to translate to channel or node number. Used for DSS B part.
TYPE - type of data (stage, flow, etc.) Used for DSS C part.
INTERVAL - time interval (15MIN, 1HOUR, 1DAY, etc.) Used for DSS E part.
PERIOD - INST (instantaneous) or AVE (average over interval).
MODIFIER - study name, etc. If this is the string 'runtime', a model run date-time string will be used; this allows different runs to automatically be labeled differently. If 'none', no string will be used. If this field is not used, and the environment variable DSM2MODIFIER is set, that will be used instead.
A_PART, B_PART, C_PART, E_PART, F_PART - DSS A, B, C, E, and F parts. (Use instead of TYPE, INTERVAL, and MODIFIER.)
FILENAME - file to write to, if it ends in DSS, use a DSS file, otherwise the output file will be a text file.

Example:

```
OUTPUTPATHS
CHAN    DIST      TYPE     INTERVAL   PERIOD    MODIFIER      FILENAME
1       0         stage    15min      inst      mrg_0718-rst  out.dss
82      0         stage    15min      inst      mrg_0718-rst  out.dss
83      LENGTH    flow     1hour      ave       mrg_0718-rst  out.txt
END
```

Input Sign and Value, Output Account Name Section

Hydro requires that sinks (flows out of nodes and reservoirs) be negative, and that sources be positive. Often sinks will be stored in a DSS file as a positive number (e.g. pumping values); this section is used to change the sign internally in DSM2 without changing the database.

Also, incoming values can be changed to other values; this is typically used to ensure proper gate code values, or perhaps fix the occasional psuedo value in a DSS file that one cannot edit.

This section is also used to assign an accounting type to matching pathnames which can be used by Qual and PTM for accounting purposes in the output.

This section has the following components:

Section keyword: TYPE

Field keywords: STRING PART MATCH SIGN ACCOUNT VALUE_IN VALUE_OUT

Section required: no Overwrite: no

Description: This section changes the sign of specified time-series input values, and assigns accounting types to matching pathnames, for later use in Qual and PTM. Hydro requires that sinks (flows out of nodes and reservoirs) be negative, and that sources be positive. Often sinks will be stored in a DSS file as a positive number (e.g. pumping values); the SIGN field will change the sign internally in Hydro without changing the database. The ACCOUNT field can be used to assign a type to matching pathnames which can later be used by Qual and PTM for accounting purposes in the output.

Field Keyword Description
STRING - string in pathname or label name to match.
PART - part of pathname or label to match (a=A part; b=name or B part;c=measurement type or C part; e=interval or E part; f=modifier or F part; l=name label; p=entire pathname).
MATCH - an exact match, or just a substring.
SIGN - make the matching pathnames a negative or positive value (it does not invert the value).
ACCOUNT - assign an accounting code to the match.
VALUE_IN - incoming value to check.
VALUE_OUT - if string and incoming value match, assign the VALUE_OUT value.

Example:

```
TYPE
STRING      PART      MATCH      SIGN
CCC         L         exact      -     # Contra Costa Canal
SWP         B         exact      -     # Banks pumping
DICU-IRR    F         sub        -     # Irrigation pumping
END
```

In the above example, Contra Costa, Banks, and agricultural diversion pumping are assigned a negative value (regardless of their sign in the DSS file) to ensure that they will be treated as sinks in Hydro.

```
TYPE
STRING      PART      MATCH      ACCOUNT
CCC         B         exact      DIV
SWP         B         exact      EXPORT
SAC         B         exact      RIM
DICU-SEEP   F         sub        SEEP
DICU-IRR    F         sub        DIV
DICU-DRN    F         sub        DRAIN
END
```

In the above example, Contra Costa Canal pumping is assigned an accounting type of DIV (diversion), Banks pumping is assigned EXPORT, all agricultural seepages are assigned SEEP, and so on. These accounting labels are written into the tidefile produced by Hydro and subsequently read by Qual and PTM.

```
TYPE
STRING      PART      MATCH      VALUE_IN   VALUE_OUT
dxc         b         exact      1.0        gate_open
END
```

In the above example, if dxc is found with a gate value of 1.0 from the DSS file, it will be changed to the GATE_OPEN value. Allowable codes are GATE_OPEN, GATE_CLOSE, and GATE_FREE. Any numeric value is also allowed.

Running the DSM2 Modules

On Unix or NT, simply type the executable name from a shell command line:

```
% hydro
% qual
% ptm
```

Command line arguments and environment variables may be used to specify the starting input file for each run.

If an argument is given on the command line, for example ""% qual qual.inp" then that is used as the first input file.

If no file name is given on the command line, the environment variable DSM2INPUT can be used to specify the first input file to read. The environment variables HYDROINPUT or QUALINPUT override DSM2INPUT. If no environment variable or command line argument is used, the default filename is dsm2.inp.

Examining DSM2 Output

Hydro, Qual, and PTM can produce output in either text files or DSS files. Additionally, Hydro produces tidefiles to convey hydrodynamic information to Qual and PTM, and both Hydro and Qual produce restart files so a run can be interrupted and restarted later. PTM can produce special files intended for graphical display of the data. None of these special purpose files will be discussed here. Only text and DSS files, produced in the OUTPUTPATHS section, are considered.

Text output files consist of blocks of data, one block for each output path requested. Each block is composed of 3 lines of DSS-style headers, followed by lines of data values. Each data value line has the date, time, and value of the output. For example:

/DELTA/134_3800/STAGE//15MIN/CMP-5D-1H/ DSS	pathname
INST-VAL	Instantaneous value or period average
FEET	Data value units
31DEC1992 2400 1.36	Date, time, and value: initial value of run
01JAN1993 0015 1.56	Computed values from run follow
01JAN1993 0030 1.75	
01JAN1993 0045 1.97	
01JAN1993 0100 2.20	
/DELTA/133_1100/STAGE//15MIN/CMP-5D-1H/	New output block
INST-VAL	
FEET	
31DEC1992 2400 1.14	
01JAN1993 0015 1.35	
01JAN1993 0030 1.59	
01JAN1993 0045 1.82	
01JAN1993 0100 2.06	

Text files can be examined with any text editor, or with some editing can be loaded into spreadsheets for more processing. Text files have a simple format so that the user can process the data further for their own purposes. The intent of DSM2 is to calculate results and output those results in a basic format for other utilities and programs to process. We will not be adding post-processing routines to DSM2 itself.

DSM2 can also output results into DSS files. DSS files are written in Fortran binary format and cannot be examined directly. Instead, the data must by downloaded from the DSS file into text (ASCII) files, or utilities which work directly with DSS files should be used. For instance, the HEC program DSSUTL can be used to view data in DSS files, print the data to files, delete or rename pathnames, and so on.

HEC also has a program called DSPLAY to produce line plots of DSS data. The Delta Modeling Section is developing a data viewer (VISTA-VISualization Tool and Analyzer) to plot data in DSS files in a variety of plotting styles.

The advantage of using DSS files, instead of text files, are that the data is stored more compactly, and for large amounts of data it is easier to use a data manager utility to select pathnames, time frames, etc., rather than trying to manipulate huge text files. IV.B. Multiple Conservative Constituent Source Output.

Multiple Conservative Constituent Source Output

Conservative constituent concentrations from multiple sources can be calculated and output in a single Qual run. The setup for this is in two parts: first, specifying any accounting names desired in the Hydro run, and second, specifying the output from Qual. Conservative constituents can be specified by three source types: named source, node source, and accounting type source. A name source must translate to a node number. Neither name sources or node sources require an accounting name specification in Hydro. However, output by accounting name does require that an accounting name be given in the Hydro run.

To specify an accounting name for Hydro, the TYPE section is used. TYPE can be used to change the sign of flows or specify accounting names. Here, only accounting name usage is reviewed. For example:

```
TYPE
STRING      PART      MATCH      ACCOUNT
CCC         B         exact      DIV
SWP         B         exact      EXPORT
SAC         B         exact      RIM
VERNALIS    L         exact      RIM
DICU-SEEP   F         sub        SEEP
DICU-IRR    F         sub        DIV
DICU-DRN    F         sub        DRAIN
END
```

The STRING field is the character string to search for in the input paths. The PART field can be one of several letter codes: a=A part; b=name or B part; c=measurement type or C part; e=interval or E part; f=modifier or F part; l=name label; p=entire pathname. MATCH can be either exact string match, or just a substring. ACCOUNT will assign any accounting label string desired by the user to those input paths matching the string.

In the example, Contra Costa Canal pumping is assigned an accounting type of DIV (diversion), Banks pumping is assigned EXPORT, all agricultural seepages are assigned SEEP, and so on. These accounting labels are written into the tidefile produced by Hydro and read by Qual and PTM.

In Qual, the standard output concentration specification is asfollows. First, the input concentrations are shown:

```
# Time-varying EC input for Qual

INPUTPATHS
NAME        MEAS_TYPE      INTERVAL ID        FILLIN      FILENAME
MTZ         EC    1hour    obs-dwr-eso        interp      input.dss
SAC         EC    1day     obs-usbr           data        input.dss
VERNALIS    EC    1day     obs-usbr           last        input.dss
END

INPUTPATHS
NAME        MEAS_TYPE    INTERVAL     ID     FILLIN      VALUE
CSMR        EC               1day     xx         last        130.
MOKE        EC               1day     xx         last        130.
END

INPUTPATHS
NODE        MEAS_TYPE    INTERVAL ID              FILLIN SDATE    FILENAME
1           EC           1MON     DICU-DRN-HIST   LAST   GENERIC  divdrn_qual.dss
3           EC           1MON     DICU-DRN-HIST   LAST   GENERIC  divdrn_qual.dss
5           EC           1MON     DICU-DRN-HIST   LAST   GENERIC  divdrn_qual.dss
etc.
END
```

Next, a basic output specification:

```
OUTPUTPATHS
NAME        TYPE        INTERVAL    PERIOD      FILENAME
union       ec          1day        ave         qual.txt
END
```

This tells Qual to output one pathname at the Union Island station (translated elsewhere to channel 125, 2,700 feet downstream). Since no source qualification is used, the concentration output will be from all sources, by default. However, by adding one of three field keywords, this can be qualified by source:

```
OUTPUTPATHS
NAME        FROM_NAME       TYPE        INTERVAL    PERIOD      FILENAME
union       mtz             ec          1day        ave         qual.txt
union       vernalis        ec          1day        ave         qual.txt
END
```

```
OUTPUTPATHS
NAME        FROM_NODE   TYPE    INTERVAL   PERIOD   FILENAME
union       1           ec      1day       ave      qual.txt
union       330         ec      1day       ave      qual.txt
END

OUTPUTPATHS
NAME        FROM_TYPE   TYPE    INTERVAL   PERIOD   FILENAME
union       drain       ec      1day       ave      qual.txt
END
```

In these examples, output at the same UNION location is requested. In the first pair of outputs, EC from Martinez and Vernalis, and from no other sources, is requested. In the second pair, EC from nodes 1 and 330 only is requested. Since Vernalis translates to node 1, those two outputs should be identical. In the last example, EC from flows with the accounting label DRAIN is requested. This would be all 258 agricultural drainage sources, as given in the input-ag.inp file.

Not yet available is a method for conveniently combining different sources in a single output path. This capability could be added if the need arises.

DSM2 on the Internet

The main URL for DSM2 is: http://wwwdelmod.water.ca.gov/

DSM2 files (source code, executables, auxiliary programs, example input, and so on) are stored in several different places. The following URL points to a collection of URLs to allow easy downloading of individual components:

http://wwwdelmod.water.ca.gov/docs/dsm2/dsm2.html#URL Collection

An e-mail discussion list is available. To join, send e-mail to majordomo@osp.water.ca.gov, and in the text area (not the subject),type in “”subscribe dsm2”.

Planning Studies

Planning studies usually use the 19-year mean tide repeatedly and monthly averaged input values, involve several variations of the same theme, and are run during several years.

Hints for Organizing Runs

- Have a shell or program loop over each year and period, setting environment variables and creating temporary files, which are then read by the input system.

- To read a temporary file, use the INP_FILES section.

- To access environment variables in the input, use dollar sign notation:

```
# rim flows from DWRSIM run
INPUTPATHS
name  a_part          b_part  c_part                 e_part  f_part   fillin  filename
sac   $DWRSIMSTUDY    137     FLOW-DOWNSTREAM        1MON    OUTPUT   last    $DWRSIMFILE
sjr   $DWRSIMSTUDY    682     FLOW-DOWNSTREAM        1MON    OUTPUT   last    $DWRSIMFILE
yolo  $DWRSIMSTUDY    55      FLOW-LOCAL_INFLOW      1MON    OUTPUT   last    $DWRSIMFILE
ccc   $DWRSIMSTUDY    528     DIVERSION-ACTUAL       1MON    OUTPUT   last    $DWRSIMFILE
nb    $DWRSIMSTUDY    55      DIVERSION-ACTUAL       1MON    OUTPUT   last    $DWRSIMFILE
END
```

- Organize input data by common factors:

    - input common to all studies and times, e.g. scalar constants, reservoir and gate names
    - input common to a particular study, e.g. channel configuration, pumping amounts